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The chief value of the work to the systematic botanist is the modern and thorough spirit with which all the plants are described. It seems to have all the merits of German scholarship at its best. The editors are A. Siebert and A. Voss. Alfred Rehder, the young German specialist on hardy trees and shrubs, who is writing at the Arnold Arboretum for the forthcoming *Cyclopedia of American Horticulture*, declares that Voss has a wonderful first-hand knowledge of the plants that are actually cultivated in Germany. He knows both the live forms and the dried specimens. The "third edition" of Vilmorin's *Blumengärtnerei* was published in 1896 by Paul Parey, at Berlin. The name is an odd one, being suggested perhaps by trade reasons. Its connection with Vilmorin's *Les Fleurs des Pleine Terre* seems to be historical and commercial, as Vilmorin's *Blumengärtnerei* is very greatly superior to the early editions of the French work, although *Les Fleurs des Pleine Terre* has had a long, honorable, and useful career. The work of Voss does not exclude greenhouse plants, as might be imagined. It includes all the most important fruits, flowers, vegetables, and ornamental plants cultivated in Germany, and therefore really amounts to a monograph of the whole horticultural world from the German point of view. The nomenclature is probably too radical for the German seedsmen, who grow many of the flower-seeds that are circulated by American dealers. It would be hard to overpraise this work. In his studies for the *Cyclopedia of American Horticulture*, the writer has come to believe that Vilmorin's *Blumengärtnerei* is in many respects the best monograph of the garden plants of the world that has appeared in the nineteenth century.—WILHELM MILLER, *Ithaca, N. Y.*

THE SOCIETY FOR PLANT MORPHOLOGY AND PHYSIOLOGY.

YALE MEETING, DECEMBER 27, 28, 1899.

THIS society met, with the American Society of Naturalists and the affiliated scientific societies, at Yale University, with Professor J. M. Macfarlane as president. The following officers were elected for the ensuing year: president, D. P. Penhallow; vice presidents, Roland Thaxter and Erwin F. Smith; secretary-treasurer, W. F. Ganong. The following new members were elected: Oakes Ames, J. M. Coulter, Carrie M. Derick, B. M. Duggar, A. W. Evans, M. A. Howe, L. R.

Jones, Henry Kræmer, F. E. Lloyd, D. T. MacDougal, Conway MacMillan, G. T. Moore, Adeline F. Schively, Hermann von Schrenk, Julia W. Snow. The most important business of general interest was the appointment of a committee to endeavor to secure better reviews of current botanical literature, as referred to below.

The address of the president, upon *Current problems in plant cytology*, will probably be published in full later. The following papers were read. In each case the synopses are made by the secretary from longer abstracts furnished by the authors, the limits of space in the GAZETTE preventing the publication of the abstracts in full.

G. E. STONE: *Geotropic experiments*.

The author has attempted to settle the old question as to the angle at which gravity acts most strongly on a geotropically sensitive organism. Grass nodes and roots of *Vicia faba* were used, and experiments with dynamometers, with averages of cut plants in moist sand at different angles, and with results of after effect of stimulation were employed. All these experiments gave similar results, namely, that the horizontal position is that of greatest geotropic excitability, and that the relationship in this respect between nodes at oblique angles and those horizontal is proportional to the cosines of their angles.

D. S. JOHNSON: *The embryo sac of Saururus cernuus*.

The primary archesporial cell divides into an upper tapetal cell, and a definitive archesporial cell, which forms three potential macrospores, the lower becoming functional and developing the usual seven-nucleate embryo sac, which becomes flask-shaped. The antipodals soon become indistinguishable, and endosperm forms in the neck of the flask before any change appears in the egg. In the ripe seed only the tip of the large nucellus has been used up in formation of endosperm, while the lower part of the embryo sac is still without endosperm or nuclei.

W. G. FARLOW: *The best way of securing a good review of current botanical literature*.

The substance of this address has already appeared in the GAZETTE for January. As a result of the address, and of discussion upon it, a committee, consisting of Messrs. Farlow, MacDougal, and von Schrenk, was appointed to endeavor to secure some improvement in the reviews of current botanical literature. The committee decided to

communicate to the editors of the *Botanisches Centralblatt*, through the secretary, the opinions of the society upon this subject.

H. S. CONARD: *Fasciation in the sweet potato*. (By invitation.)

The author pointed out that fasciations are very common in sweet-potato plants, particularly those from rich soil, and that of such plants one half to one per cent. are ring-fasciated. The tubular parts, which may be two or three feet long, bear leaves and adventitious roots within, and show two bundle systems, an outer and an inner, which are alike except that the latter faces the tube cavity. They are entirely separate, but merge upward into a ring-shaped meristem, and downward the inner system gradually disappears below the end of the tube.

F. C. STEWART: *Leaf scorch of the sugar beet*.

This paper has since been published in the New York Agricultural Experiment Station Bulletin no. 162. Proofs were given that a sudden blackening and death of the foliage of sugar beets in central New York in August 1899 was due not to parasitic organisms but to scorching through excessive transpiration.

F. GRACE SMITH: *Distribution of red color in vegetative parts in the New England flora*. (By invitation.)

The author discussed the various theories hitherto advanced to explain the presence of red color in vegetative parts of plants, to test which she has observed the occurrence of red in the New England flora, classifying its distribution according to the part in which the color occurs, and the relationship of the red organ to outside conditions, and tabulating the results in percentages. In general they show that red occurs preponderantly in conducting parts, and in those exposed to light and dryness, but the results do not agree with any of the current theories; whence the conclusion is drawn that the meaning of the color must be different in different cases, or else it is determined by some factor to which we as yet have no clue.

D. P. PENHALLOW: *The morphology of certain plants from the Devonian of Europe and America*.

The author traced the history of the important fossil *Parkia decipiens*, which was first proven to be of plant origin by Dawson and Penhallow in 1891. Remains since discovered have shown that it possesses macro- and microsporangia, and that it is closely related to Marsilia and Pilularia. Another fossil of much importance is Dawson's

Nematophyton, of which no fruit has yet been obtained. The stem structure however is pseudo-exogenous, and closely like that of many Laminariæ. A remarkable and misleading crystallization effect was described. The paper was fully illustrated by photographs projected by the stereopticon.

G. T. MOORE: *Notes on the morphology and reproduction of Chlorocystis Cohnii.* (By invitation.)

This unicellular alga, growing on Enteromorpha, was described, several errors of earlier observers corrected, and some new information given. It is not always an endophyte but as often an epiphyte. The chromatophore varies from the one-sided arrangement, hitherto considered typical, to a complete lining of the wall. Two sizes of zoospores are formed, but no conjugation is probable. Discharge of the zoospores occurs through a circular opening and not through a tubular neck as formerly described.

D. T. MACDOUGAL and F. E. LLOYD: *The roots and mycorrhizal adaptations of the Monotropaceæ.* (By invitation.)

The authors have investigated *Monotropa uniflora* and describe the histology of its roots, and the structure and mode of entrance of the fungus. In general the following seems true of all Monotropaceæ so far studied: the shoots lack chlorophyll and usually stomata; the usual relations of size of shoot to root are lost; the stele is much reduced and consists only of perforated vessels and companion cells; the fungus encloses the tip and penetrates the epidermis, forming special structures in the latter. The relation of fungus to host is a pure symbiosis.

R. THAXTER: *The structure and reproduction of Compsopogon.*

The author gave some account of the distribution of Compsopogon in Florida and described its general structure, calling attention to the fact that the older filaments may possess a cortex consisting of from two to four layers of cells. The details of cell structure and the normal reproduction by aplanospores were illustrated, as well as the formation of smaller aplanospores derived from sorus-like groups of superficial cells. The paper will be published in full in the BOTANICAL GAZETTE.

HERMANN VON SCHRENK: *Some diseases of New England Coniferaæ.* (By invitation.)

The coniferous woods of this region are being destroyed by the mycelia of a number of fungi, chiefly of the genus Polyporus, which

act by destroying the lignin and leaving pure cellulose, or by transforming the wood into a brown brittle substance. The changes are brought about by an enzyme, and their extent is determined by the formation of decomposition products which stop the enzyme action at a certain point. Six forms of wood destruction were described, of which specimens and photographs were shown.

F. H. BLODGETT: *Vegetative reproduction and multiplication in Erythronium*. (By invitation.)

The author described the common origin, within the bulb, of the runners and annual bulbs; they come from axillary buds between the base of the stem and the inner bulb scale. He described also the development of the first bud from the seedling. From the seed the life cycle occupies not less than four years, probably longer in most cases, during which time several plants are developed.

HENRY KRAEMER: *The structure of starch grains*. (By invitation.)

The author discussed the meaning of the different appearances given in drawings of starch grains by different authors, some drawing the hilum as light and others as dark, and showed that the differences are due to the particular view (*i. e.*, focus) of the grain taken by the student. Treatment with iodine and aniline colors shows that the layers consist of substance rich in colloids but poor in crystalloids, alternating with substance rich in crystalloids and poor in colloids. The opinions of other authors as to the meaning of these layers were discussed.

RODNEY H. TRUE: *The toxic action of a series of sodium salts*. (By invitation.)

From experimental results worked out by Drs. Kahlenberg and True, the latter formulated the results presented. After studying the toxic action exerted on roots of *Lupinus albus* by a series of acids, and by their Na salts, it was determined, in view of the ionization of those compounds, to make an analysis of their toxic action into the partial toxicities due respectively to H ions, anions, and un-ionized molecules. The results were presented in detail.

F. E. LLOYD: *Further notes on the embryology of the Rubiaceæ*. (By invitation.)

A continuation of the author's studies which formerly covered only the Stellatae, but now include Diodia, Cephalanthus, and Richardsonia.

A comparative account was given of the development of ovule, embryo sac, antipodal cells, funicle, and suspensor.

J. B. POLLOCK: *The stimuli that cause the so-called "peg" or "heel" on Cucurbita seedlings.*

No abstract furnished.

W. C. COKER: *On the prothallus of Taxodium distichum.* (By invitation.)

The development of the embryo-sac, archegonia, endosperm, pollination, development of the male pro-nuclei, fertilization, and development of the pro-embryo are described in full.

A. W. EVANS: *A new type of branching in the leafy Hepaticæ.* (By invitation.)

The terminal branching in this group, according to Leitgeb, always occurs in the ventral half of one of the lateral segments cut off from the apical cell. In *Mastigobryum integrifolium* Aust. of the Hawaiian islands, however, it occurs in both lateral and ventral segments, showing that it is much less restricted than hitherto supposed.

E. B. COPELAND: *The geotropism of split stems.* (By invitation.)

Numerous experiments by the author show that if a stem be split into two equal halves lengthwise and then placed horizontally the rate of growth of the lower half is accelerated and of the upper depressed. This of course occurs in an uncut stem, but this result shows that there is no necessity for assuming a transverse transmission of the stimulus, as has hitherto been held. The paper will be published in full in the BOTANICAL GAZETTE.

HARRIET B. WINSOR and W. F. GANONG: *Some variations and correlations in the leaves of trees.*

The authors presented the results of an attempt to apply statistical methods to the study of an ecological problem, namely the influences determining the length of the petiole and the shape of the leaf. Trees were selected, and measurements made upon five hundred specimens of leaves from different positions and the results plotted in curves. The paper was offered as an illustration of method, and the studies are to be continued.

J. M. MACFARLANE: *Perennation in the stem of Lycopodium alopecuroides.*

The author showed that the branch in this species dips into the ground in autumn by geotropic growth. This part becomes colorless,

loaded with starch, and bears modified leaves, the whole forming a hook-like structure which lies dormant until the next spring, when it again comes to the surface and resumes the usual development. The peculiarity is being acquired, for some plants growing under special conditions show it but feebly.

W. F. GANONG: *The phytocology of the Bay of Fundy salt marshes.*

The great salt marshes at the head of the Bay of Fundy offer some features differentiating them both physically and in their vegetation from other known salt marshes. The processes of reclaiming them allow many stages in the succession of plants to be seen, and this paper described the vegetation and its peculiar features from the dynamical point of view.

H. J. WEBBER: *Complications in Citrus hybridization caused by polyembryony.*

The author pointed out, and illustrated by photographs, the fact that in polyembryonic Citrus seeds, which are result of hybridization, only one of the embryos shows any trace of characters of the pollen parent while all others are like the ovule parent. Doubtless the true hybrid is derived from the fertilized egg-cell, and all the others from adventive embryos produced by nucellar tissue. The fact has a practical bearing for Citrus hybridizers in that it will be necessary to raise many embryos into seedlings before the hybrid can be found.

W. F. GANONG,

Secretary.

CERASTIUM ARVENSE OBLONGIFOLIUM.

IN 1887 Hollick and Britton, in a paper on "*Cerastium arvense* L. and its North American varieties,"¹ remarked that the variety *oblongifolium*, as it occurs from southern New York to Maryland, "is apparently confined to magnesian rocks," such as areas of serpentine and magnesian limestone, citing several localities in proof of it. They were not so confident about it in other places, though mentioning one from which the original of Torrey's *C. oblongifolium* came, "a region of magnesian limestone near Sandusky, Ohio." Having in May last found this variety—or perhaps one which agrees more closely with the variety *maximum* of Hollick and Britton—on a limestone ledge near Lockport,

¹ Bull. Torr. Bot. Club 14: 45. 1887.